

REMARKS

Reconsideration of the above-referenced application in view of the amendments and the following remarks is respectfully requested.

Claims 1-6 were pending in this case. Claims 1, 4, 5, and 6 have been amended to further define the features of the claimed invention. New Claims 7 and 8 have been added.

The inventors' Declaration was objected to as not identifying this application or the provisional application from which it claims priority. Applicant was referred to 37 CFR 1.67(a), MPEP 601.01(a), MPEP 602.01, and MPEP 602.02. Applicant can find no requirement in the referenced publications for including the application or provisional application information on the inventor declaration form. The only relevant requirement that Applicant can find is in 37 CFR 1.63(b)(1) where it is stated that the declaration must "[i]dentify the application to which it is directed." The declarations executed by the inventors on 9/2/99, 9/3/99, and 9/4/99 all identify the application by the attorney docket number (TI-22451) and the titled of the disclosure (Strapless Lead Frame), thereby meeting the statutory requirement. Applicant points out that the Declarations filed in this application thus far are original declarations and that no new matter has been added since the declarations were executed. These are not supplemental declarations. Applicant believes this reply is responsive to the Examiner's objection, but respectfully requests further clarification and guidance if the Examiner disagrees.

The specification was objected to as including an informality relating to the lack of a reference to the provisional application from which this application claims priority. Applicant points out that the Utility Patent Application Transmittal

Form filed with this application on September 9, 1999 includes the statement "[o]n Page 1 of the specification, before line 1, insert –This application claims priority under 35 USC § 119(e)(1) of provisional application number 60/099,595 filed 09/09/98.—" Applicant believes this addresses the objection, but respectfully requests further clarification and guidance if the Examiner disagrees.

Claims 4 and 6 were objected to as including informalities. Claims 4 and 6 have been in response to the objection.

Claim 2 stands rejected under 35 U.S.C. 112, second paragraph. In response, Claim 1, the claim upon which Claim 2 depends, has been amended to include antecedent basis for the term "the semiconductor die." Applicant submits that Claim 2 is now in statutory form.

Claims 1 and 2 stand rejected under 35 U.S.C. 102(b) as being anticipated by Ohno, et al. (U.S. Patent No. 5,227,662). Applicant respectfully traverses the rejection. Claim 1, as amended, includes the feature "said semiconductor die mounted on said heat slug, wherein bond pads on said semiconductor die are attached to said lead frame leads with bond wires." Ohno discloses a composite structure in which a lead frame has relatively large and widely spaced outer leads 12 arranged around window 18. The Tape Automated Bonding (TAB) inner structure shown in Ohno's Figure 1D fits inside window 18. The TAB structure includes leads 30 to which bond pads on the semiconductor die are bonded (see Figures 5 and 7 in which die 34 is connected by bond wires 36 to TAB traces 28 on film 22, *not* to leads 12 of leadframe 10). Since Ohno does not disclose all of the elements of Claim 1, Applicant respectfully submits that Claim 1 is patentable over Ohno. Claim 2 depends from Claim 1 and is therefore patentable over Ohno for the reasons presented above.

Claims 3-6 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Ohno in view of Ootsuki, et al. (U.S. Patent No. 5,652,461). Applicant

respectfully traverses the rejection. Claims 3 and 4 depend from Claim 1. As indicated above, Claim 1 includes the feature "said semiconductor die mounted on said heat slug, wherein bond pads on said semiconductor die are attached to said lead frame leads with bond wires." Since Ohno does not teach or suggest attaching bond wires to the leads 12 on lead frame 10, Applicant submits that Claim 1 is patentable over Ohno. Applicant submits further that one skilled in the art would receive no motivation from the prior art for the combination of the teachings of Ohno with the teachings of Ootsuki. Ohno's composite lead frame, with a TAB core section, is a teaching away from the traditional lead frame taught by Ootsuki. Therefore, Applicant submits that Claim 1, and Claims 3-4, which depend therefrom, are patentable over the combined references. Claim 5 includes a similar feature to that described above with respect to Claim 1. Applicant therefore submits that Claim 5 and Claim 6 depending therefrom are patentable over the combined references.

Similarly, New Claim 7 includes the feature "bond wires coupling said bond pads on said die to said inner ends of said leads." Therefore, Applicant respectfully requests that Claims 7 and 8 be passed to issuance along with Claims 1-6.

Applicant respectfully requests reconsideration and withdrawal of the rejections and allowance of Claims 1-8. If the Examiner has any questions or other correspondence regarding this application, Applicant requests that the Examiner contact Applicants' attorney at the below listed telephone number and address.

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Respectfully submitted,



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Version with Markings to Show Changes Made

In the Claims:

1. (Three times amended) A semiconductor die and strapless lead frame/heat slug combination, comprising:

lead frame leads, all of said leads being evenly distributed around a semiconductor die mount area; [and]

a heat slug providing the die mount area, wherein said heat slug is attached under the lead frame with tape; and

said semiconductor die mounted on said heat slug, wherein bond pads on said semiconductor die are attached to said lead frame leads with bond wires.

2. (twice amended) The strapless lead frame according to Claim 1, wherein the semiconductor die has four sides and corners, and the lead frame leads are all evenly distributed on each of the four sides and around the corners.

3. The strapless lead frame according to Claim 1, wherein the lead frame has four sides and two of said four sides have a different number of leads from two other sides.

4. (twice amended) The strapless lead frame according to Claim 1, wherein said semiconductor die has a different number of bond pads on adjacent sides, and at least one of said bond pads is attached to a bond wire, said bond wire is attached to a lead frame lead on a side of the lead frame adjacent to the side of the semiconductor die on which the bond pad is located

5. (Three times amended) A semiconductor die and strapless lead frame combination [for use with heat slug packages], comprising:

lead frame leads, all of said leads being evenly distributed around a semiconductor die mount area; [and]

a heat slug providing a rectangular die mount area, wherein said heat slug is attached under the lead frame with tape, there being the same number of lead frame leads on opposites sides of the lead frame and a different number of lead frame leads on adjacent sides of the lead frame; and

said semiconductor die mounted on said heat slug, wherein bond pads on said semiconductor die are attached to said lead frame leads with bond wires.

6. (twice amended) The strapless lead frame according to Claim 5, wherein said [including a] semiconductor die has [with] a different number of bond pads on adjacent sides and the same number of bond pads on opposite sides, and at least one of said bond pads is attached to a bond wire, said bond wire is attached to a lead frame lead on a side of the lead frame adjacent to the side of the semiconductor die on which the bond pad is located.

Please add the following new claim:

7. (new) A packaged semiconductor device, comprising:

a unitary lead frame comprising leads arranged around a central die mounting region, said lead frame having four sides with leads having outer ends arranged on said four sides and inner ends all of which are evenly spaced around said central die mounting region;

a heat slug, said heat slug attached to a bottom surface of said lead frame such that said inner ends of said leads overlap said heat slug;

a semiconductor die mounted on said heat slug in said central die mounting region of said lead frame, said die including bond pads arranged along all four edges of said die; and

bond wires coupling said bond pads on said die to said inner ends of said leads.

8. (new) The packaged semiconductor device of Claim 7, wherein said semiconductor die has a different number of bond pads on adjacent sides and the same number of bond pads on opposite sides, and at least one of said bond pads is attached to a bond wire, said bond wire is attached to a lead frame lead on a side of the lead frame adjacent to the side of the semiconductor die on which the bond pad is located.